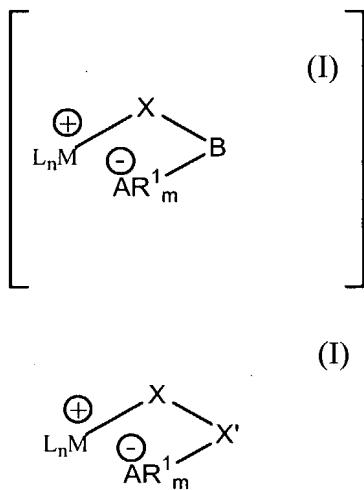


AMENDMENTS TO THE CLAIMS

1. (currently amended) A zwitterionic transition metal compound of the formula I



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where

L are identical or different and are each a π -ligand or an electron donor, n is equal to 1, 2, 3 or 4,

M is a metal atom of group IIIb, IVb, Vb or VIb of the Periodic Table of the Elements,

X is a heteroatom or a hydrocarbon group having 1-40 carbon atoms,

X' is a hydrocarbon group having 1-40 carbon atoms,

A is an atom of group Ib, IIb, IIIa, IIIb, IVa, Va, Vb, VIb, VIIb or VIIIb of the Periodic Table of the Elements,

R¹ are identical or different and are each a perhalogenated C₁-C₄₀-hydrocarbon radical, and m is equal to 1, 2, 3, 4 or 5.

2. (original) A transition metal compound as claimed in claim 1, wherein the radicals L are identical or different and are each a π -ligand.

3. (original) A transition metal compound as claimed in claim 1, wherein the radicals L are identical or different and are each an unsubstituted or substituted cyclopentadienyl group.

4. (original) A transition metal compound as claimed in claim 1, wherein the radicals L are linked to one another via a bridge.

5. (original) A transition metal compound as claimed in claim 1, wherein n=2 when M is a metal atom of group IVb of the Periodic Table of the Elements.

6. (original) A transition metal compound as claimed in claim 1, wherein M is a metal atom of group IVb of the Periodic Table of the Elements, n is equal to 2,

L are identical or different and are each a substituted or unsubstituted cyclopentadienyl group, where two radicals L are optionally linked to one another via a bridge Z and

Z is CR²R³ or SiR²R³ or a unit Si—(CR²R³)_x—Si which links two fragments

L_nM⁺XX'—A—R¹_m with one another, where x is an integer from 0 to 10,

X and X' together form a three-membered to five-membered hydrocarbon chain which can be saturated or unsaturated and are unsubstituted or substituted by one or more C₁-C₂₀-hydrocarbon radicals,

R² and R³ are identical or different and are each a hydrogen atom, a halogen atom, a C₁-C₂₀-alkyl group, a C₁-C₁₀-fluoralkyl group, a C₁-C₁₀-alkoxy group, a C₆-C₁₄-

aryl group, a C₆-C₁₀-fluoroaryl group, a C₆-C₁₀-aryloxy group, a C₂-C₁₀-alkenyl group, a C₇-C₄₀-arylalkyl group, a C₇-C₄₀-alkylaryl group, a C₈-C₄₀-arylalkenyl group, or R² and R³ together with the atoms connected them form one or more rings, and R² and R³ are optionally bonded to L;

A is an atom of group Ib, IIB, IIIa, IVa, Va, Vb of the Periodic Table of the Elements,

R¹ are identical or different and are each a perfluorinated alkyl or aryl group having from 1 to 20 carbon atoms and

m is equal to 2, 3 or 4.

7. (original) A transition metal compound as claimed in claim 6, wherein

M is zirconium,

n is equal to 2,

L are identical or different and are each a substituted cyclopentadienyl group, where two radicals L are linked to one another via a bridge Z, where Z is CR² R³ or SiR² R³ and R² and R³ are as defined in claim 6,

X and X' together form an unsaturated four-membered hydrocarbon chain whose hydrogen atoms are optionally replaced by C₁-C₂₀-alkyl groups,

A is boron atom,

R¹ are identical and are each a pentafluorophenyl group (C₆F₅) and

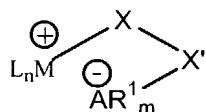
m is equal to 3.

8. (original) A catalyst component comprising at least one transition metal compound as claimed in claim 1.

9. (original) A catalyst component as claimed in claim 8, additionally containing a support.

10. (currently amended) A process for preparing a compound according to claim 1 of the formula I,

(I)



where

L are identical or different and are each a π ligand or an electron donor, n is equal to 1, 2, 3 or 4,

M is a metal atom of group IIIb, IVb, Vb or VIb of the Periodic Table of the Elements,

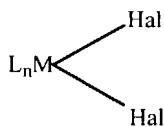
X is a heteroatom or a hydrocarbon group having 1-40 carbon atoms,

X' is a hydrocarbon group having 1-40 carbon atoms,

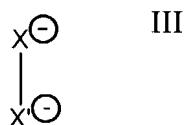
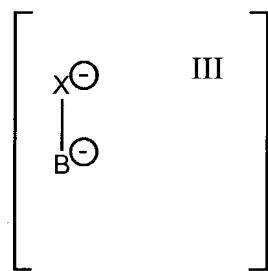
A is an atom of group Ib, IIb, IIIa, IIIb, IVa, Va, Vb, VIb, VIIb or VIIIb of the Periodic Table of the Elements,

R¹ are identical or different and are each a perhalogenated C₁-C₄₀-hydrocarbon radical, and m is equal to 1, 2, 3, 4 or 5, which comprises reacting a compound of the formula II

II

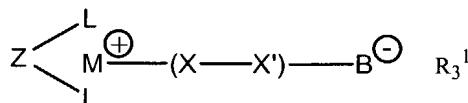


with a compound of the formula III



and reacting the reaction product with a compound of the formula AR^1_m , where L, n, M, $[\underline{X}, \underline{B}]$, $\underline{X}, \underline{X}'$, A, R^1 and m in the formulae II, III and AR^1_m are as defined for the formula I and Hal is a halogen atom.

11. (original) A zwiterionic transition metal compound of the formula



wherein: L and L' are identical or different and are each a substituted or unsubstituted cyclopentadienyl group;

Z is a bridge linking together said L and L' and is a group of the formula CR^2R^3 or

SiR^2R^3 ;

R^2 and R^3 are identical or different and are each a hydrogen atom, a halogen atom, a $\text{C}_1 - \text{C}_{20}$ -alkyl group, a $\text{C}_1 - \text{C}_{10}$ -fluoralkyl group, a $\text{C}_1 - \text{C}_{10}$ -alkoxy group, a $\text{C}_6 - \text{C}_{14}$ -aryl group, a $\text{C}_6 - \text{C}_{10}$ -fluoroaryl group, a $\text{C}_6 - \text{C}_{10}$ -aryloxy group, a $\text{C}_2 - \text{C}_{10}$ -alkenyl group, a $\text{C}_7 - \text{C}_{40}$ -arylalkyl group, a $\text{C}_7 - \text{C}_{40}$ -alkylaryl group, a $\text{C}_8 - \text{C}_{40}$ -

arylalkenyl group, or R² and R³ together with the atoms connected them form one or more rings, and R² and R³ are optionally bonded to L;

M is a metal atom of group IVb of the Periodic Table of the Elements;

X-X' is a 3- to 5-membered saturated or unsaturated hydrocarbon chain which is

unsubstituted or substituted by one or more C₁ -C₂₀ -hydrocarbon radicals; and the R¹ radicals are identical or different and are each a perfluorinated alkyl or aryl group having from 1 to 20 carbon atoms.

12. (original) A catalyst system for olefin polymerization comprising a transition metal compound of claim 11 and, optionally, a catalyst support material.

13. (original) A catalyst system as claimed in claim 12, wherein said catalyst system is essentially free of an aluminoxane except when said catalyst support material is present and is a solid aluminoxane.

14. (original) The catalyst as claimed in claim 8, wherein M is titanium, zirconium or hafnium.

15. (original) The catalyst as claimed in claim 12, wherein M is zirconium.

16. (original) The catalyst as claimed in claim 14, wherein an unsubstituted or M is Zr,

n is equal to 2,

L are identical or different and are each a substituted cyclopentadienyl group, where two radicals L are linked to one another via a bridge Z, and

Z is CR² R³ or SiR² R³ or a unit Si—(CR² R³)_x—Si which links two fragments L_n M⁺

XX'A—R¹_m with one another, where x is an integer from 0 to 10,

X and X' together form a three-membered to five-membered (C₃ -C₅)-alkyl chain which is saturated or unsaturated and optionally substituted by C₁ -C₂₀ -hydrocarbon radicals,

A is a metal of group Ib, IIB, IIIb, IVa, Vb, of the Periodic Table of the Elements,

R¹ are identical or different and are each a pentafluorinated alkyl or aryl group having from 1 to 20 carbon atoms,

R² and R³ are identical or different and are each a hydrogen atom, a halogen atom, a C₁ -C₂₀ -alkyl group, a C₁ -C₁₀ -fluoralkyl group, a C₁ -C₁₀ -alkoxy group, a C₆ -C₁₄ -aryl group, a C₆ -C₁₀ -fluoroaryl group, a C₆ -C₁₀ -aryloxy group, a C₂ -C₁₀ -alkenyl group, a C₇ -C₄₀ -arylalkyl group, a C₇ -C₄₀ -alkylaryl group, a C₈ -C₄₀ -arylalkenyl group and

m is equal to 3.

17. (original) The catalyst as claimed in claim 8, wherein

M is zirconium,

n is equal to 2,

L are identical or different and are each a substituted cyclopentadienyl group, where two

radicals L are bonded to one another via a bridge Z, where Z is CR² R³ or SiR² R³,

X and X' together form an unsaturated four-membered (C₄)-alkyl chain whose hydrogen

atoms can also be replaced by C₁ -C₂₀ -alkyl groups,

A is a boron atom,

R¹ are identical and are each a pentafluorophenyl group (C₆F₅),

R² and R³ are identical or different and are each a hydrogen atom, a halogen atom, a C₁ -C₂₀ -alkyl group, a C₁ -C₁₀ -fluoralkyl group, a C₁ -C₁₀ -alkoxy group, a C₆ -C₁₄ -aryl group, a C₆ -C₁₀ -fluoroaryl group, a C₆ -C₁₀ -aryloxy group, a C₂ -C₁₀ -alkenyl group, a C₇ -C₄₀ -arylalkyl group, a C₇ -C₄₀ -alkylaryl group, a C₈ -C₄₀ -arylalkenyl group and m is equal to 3.

18. (original)The compound as claimed in claim 1, wherein the transition metal

compound of the formula I is selected from the group consisting of

bis(cyclopentadienyl)Zr⁺CH₂CHCHCH₂B⁻(C₆F₅)₃;

bis(methylcyclopentadienyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

bis(n-butylcyclopentadienyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

bisindenylZr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

(tert-butylamido)dimethyl(tetramethyl- η^5 -cyclopentadienyl)silaneZr⁺CH₂

CHCHCH₂ B⁻ (C₆ F₅)₃;

bis(2-methylbenzoindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediylbis(2-methylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediylbisindenylZr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediylbis(2-methylbenzoindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediyl(2-methylbenzoindenyl)(2-methylindenyl)Zr⁺ CH₂ CHCHCH₂

B⁻ (C₆ F₅)₃;

dimethylsilanediyl(2-methylbenzoindenyl)(2-methyl-4-phenylindenyl)Zr⁺ CH₂

CHCHCH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediyl(2-methylindenyl)(4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediylbis(2-methyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediylbis(2-methyl-4,6-diisopropylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediylbis(2-methyl-4-naphthylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

isopropylidene(cyclopentadienyl)(fluorenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

isopropylidene(cyclopentadienyl)(indenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

[4-η⁵-cyclopentadienyl-4,7,7-trimethyl-(η⁵-4,5,6,7-tetrahydroindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediylbis(2-methylindenyl)Zr⁺ OCH₂ CH₂ CH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediylbisindenylZr⁺ OCH₂ CH₂ CH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediylbis(2-methylbenzoindenyl)Zr⁺ OCH₂ CH₂ CH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediyl(2-methylbenzoindenyl)(2-methylindenyl)Zr⁺ OCH₂ CH₂ CH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediyl(2-methylbenzoindenyl)(2-methyl-4-phenylindenyl)Zr⁺ OCH₂ CH₂ CH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediyl(2-methylindenyl)(4-phenylindenyl)Zr⁺ OCH₂ CH₂ CH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediylbis(2-methyl-4-phenylindenyl)Zr⁺ OCH₂ CH₂ CH₂ B⁻ (C₆ F₅)₃;
dimethylsilanediylbis(2-methyl-4,6-diisopropylindenyl)Zr⁺ OCH₂ CH₂ CH₂ B⁻ (C₆ F₅)₃;
dimethylsilanediylbis(2-methylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (CF₃)₃;
dimethylsilanediylbisindenylZr⁺ CH₂ CHCHCH₂ B⁻ (CF₃)₃;
dimethylsilanediylbis(2-methylbenzoindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (CF₃)₃;
dimethylsilanediyl(2-methylbenzoindenyl)(2-methylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (CF₃)₃;
dimethylsilanediyl(2-methylbenzoindenyl)(2-methyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (CF₃)₃;
dimethylsilanediyl(2-methylindenyl)(4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (CF₃)₃;
dimethylsilanediylbis(2-methyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (CF₃)₃;
dimethylsilanediylbis(2-methyl-4,6-diisopropylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (CF₃)₃;
dimethylsilanediylbis(2-methyl-4-naphthylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (CF₃)₃;
dimethylsilanediylbis(2-methylindenyl)Zr⁺ CH₂ C(CH₃)C(CH₃)CH₂ B⁻ (CF₃)₃;
dimethylsilanediylbisindenylZr⁺ CH₂ C(CH₃)C(CH₃)CH₂ B⁻ (CF₃)₃;
dimethylsilanediylbis(2-methylbenzoindenyl)Zr⁺ CH₂ C(CH₃)C(CH₃)CH₂ B⁻ (CF₃)₃;
dimethylsilanediyl(2-methylbenzoindenyl)(2-methylindenyl)Zr⁺ CH₂ C(CH₃)C(CH₃)CH₂ B⁻ (CF₃)₃;
dimethylsilanediyl(2-methylbenzoindenyl)(2-methyl-4-phenylindenyl)Zr⁺ CH₂

C(CH₃)C(CH₃)CH₂ B⁻(CF₃)₃;

dimethylsilanediyl(2-methylindenyl)(4-phenylinenyl)Zr⁺ CH₂

C(CH₃)C(CH₃)CH₂ B⁻(CF₃)₃;

dimethylsilanediylbis(2-methyl-4-phenylinenyl)Zr⁺ CH₂ C(CH₃)C(CH₃)CH₂ B⁻

(CF₃)₃;

dimethylsilanediylbis(2-methyl-4,6-diisopropylindenyl)Zr⁺ CH₂

C(CH₃)C(CH₃)C₂ B⁻(CF₃)₃;

dimethylsilanediylbis(2-methyl-4-naphthylindenyl)Zr⁺ CH₂ C(CH₃)C(CH₃)CH₂

B⁻(CF₃)₃;

methylphenylmethylenefluorenly(cyclopentadienyl)Zr⁺ CH₂ CHCHCH₂ B⁻(C₆

F₅)₃;

diphenylmethylenefluorenly(cyclopentadienyl)Zr⁺ CH₂ CHCHCH₂ B⁻(C₆ F₅)₃;

isopropylidene(3-methylcyclopentadienyl)fluorenlyZr⁺ CH₂ CHCHCH₂ B⁻(C₆

F₅)₃;

dimethylsilanediyl(3-tert-butylcyclopentadienyl)fluorenlyZr⁺ CH₂ CHCHCH₂

B⁻(C₆ F₅)₃;

diphenylsilanediyl(3-(trimethylsilyl)cyclopentadienyl)fluorenlyZr⁺ CH₂

CHCHCH₂ B⁻(C₆ F₅)₃;

phenylmethylsilanediylbis(2-methylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻(C₆ F₅)₃;

phenylmethylsilanediylbisindenylZr⁺ CH₂ CHCHCH₂ B⁻(C₆ F₅)₃;

phenylmethylsilanediylbis(2-methyl-4,5-benzoindeny)Zr⁺ CH₂ CHCHCH₂ B⁻(C₆

F₅)₃;

phenylmethylsilanediyl(2-methyl-4,5-benzoindeny)(2-methylindenyl)Zr⁺ CH₂

CHCHCH₂ B⁻ (C₆ F₅)₃;

phenylmethylsilanediyl(2-methyl-4,5-benzoindenyl)(2-methyl-4-phenylindenyl)

Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

phenylmethylsilanediyl(2-methylindenyl)(4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂

B⁻ (C₆ F₅)₃;

phenylmethylsilanediylbis(2-methyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

phenylmethylsilanediylbis(2-ethyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

phenylmethylsilanediylbis(2-methyl-4,6-diisopropylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

phenylmethylsilanediylbis(2-methyl-4-naphthylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylenebis(2-methylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylenebisindenylZr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylenebis(2-methyl-4,5-benzoindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylene(2-methyl-4,5-benzoindenyl)(2-methylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylene(2-methyl-4,5-benzoindenyl)(2-methyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylene(2-methylindenyl)(4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylenebis(2-methyl-4,5-benzoindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylenebis(2-methyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylenebis(2-methyl-4,6-diisopropylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;
ethylenebis(2-methyl-4-naphthylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;
ethylenebis(2-ethyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;
ethylenebis(2-ethyl-4,6-diisopropylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;
ethylenebis(2-ethyl-4-naphthylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;
dimethylsilanediylbis(2-ethyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;
dimethylsilanediylbis(2,3,5-trimethylcyclopentadienyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;
1. 6-{bis[methylsilylbis(2-methyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃] }hexane;
1,6-{bis[methylsilylbis(2-ethyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃] }hexane;
1,6-{bis[methylsilylbis(2-methyl-4-naphthylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃] }hexane;
1,6-{bis[methylsilylbis(2-methyl-4,5-benzoindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃] }hexane;
1,6-{bis[methylsilyl(2-methyl-4-phenylindenyl)(2-methylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃] }hexane;
1,2-{bis[methylsilylbis(2-methyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃] }ethane;
1,2-{bis[methylsilylbis(2-ethyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃] }ethane;
1,2-{bis[methylsilylbis(2-methyl-4-naphthylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆

$\text{F}_5)_3$ } } ethane;

1,2-{bis[methylsilylbis(2-methyl-4,5-benzoindenyl)]Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃ } } ethane; and

1,2-{bis[methylsilyl(2-methyl-4-phenylindenyl)(2-methylindenyl)]Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃ } } ethane.

19. (original) The catalyst as claimed in claim 8, wherein the transition metal compound of the formula I is selected from the group consisting of

bis(cyclopentadienyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

bis(methylcyclopentadienyl)Zr⁺ C₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

bis(n-butylcyclopentadienyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

bisindenylZr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

(tert-butylamido)dimethyl(tetramethyl- η^5 -cyclopentadienyl)silaneZr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

bis(2-methylbenzoindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediylbis(2-methylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediylbisindenylZr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediylbis(2-methylbenzoindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediyl(2-methylbenzoindenyl)(2-methylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediyl(2-methylbenzoindenyl)(2-methyl-4-phenylindenyl)Zr⁺ CH₂

CHCHCH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediyl(2-methylindenyl)(4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediylbis(2-methyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediylbis(2-methyl-4,6-diisopropylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediylbis(2-methylbenzoindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (CF₃)₃;

dimethylsilanediyl(2-methylbenzoindenyl)(2-methylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (CF₃)₃;

dimethylsilanediyl(2-methylbenzoindenyl)(2-methyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (CF₃)₃;

dimethylsilanediyl(2-methylindenyl)(4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (CF₃)₃;

dimethylsilanediylbis(2-methyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (CF₃)₃;

dimethylsilanediylbis(2-methyl-4,6-diisopropylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (CF₃)₃;

dimethylsilanediylbis(2-methyl-4-naphthylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (CF₃)₃;

dimethylsilanediylbis(2-methylindenyl)Zr⁺ CH₂ C(CH₃)C(CH₃)CH₂ B⁻ (CF₃)₃;

dimethylsilanediylbisindenylZr⁺ CH₂ C(CH₃)C(CH₃)CH₂ B⁻ (CF₃)₃;

dimethylsilanediylbis(2-methylbenzoindenyl)Zr⁺ CH₂ C(CH₃)C(CH₃)CH₂ B⁻ (CF₃)₃;

dimethylsilanediyl(2-methylbenzoindenyl)(2-methylindenyl)Zr⁺ CH₂ C(CH₃)C(CH₃)CH₂ B⁻ (CF₃)₃;

dimethylsilanediyl(2-methylbenzoindenyl)(2-methyl-4-phenylindenyl)Zr⁺ CH₂ C(CH₃)C(CH₃)CH₂ B⁻ (CF₃)₃;

dimethylsilanediyl(2-methylindenyl)(4-phenylindenyl)Zr⁺ CH₂

C(CH₃)C(CH₃)CH₂ B⁻(CF₃)₃;
dimethylsilanediylbis(2-methyl-4-naphthylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻(C₆F₅)₃;
isopropylidene(cyclopentadienyl)(fluorenyl)Zr⁺ CH₂ CHCHCH₂ B⁻(C₆F₅)₃;
isopropylidene(cyclopentadienyl)(indenyl)Zr⁺ CH₂ CHCHCH₂ B⁻(C₆F₅)₃;
[4-η⁵-cyclopentadienyl-4,7,7-trimethyl-(η⁵-4,5,6,7-tetrahydroindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻(C₆F₅)₃;
dimethylsilanediylbis(2-methylindenyl)Zr⁺ OCH₂ CH₂ CH₂ B⁻(C₆F₅)₃;
dimethylsilanediylbisindenylZr⁺ OCH₂ CH₂ C₂ B⁻(C₆F₅)₃;
dimethylsilanediylbis(2-methylbenzoindenyl)Zr⁺ OCH₂ CH₂ CH₂ B⁻(C₆F₅)₃;
dimethylsilanediyl(2-methylbenzoindenyl)(2-methylindenyl)Zr⁺ OCH₂ CH₂ CH₂ B⁻(C₆F₅)₃;
dimethylsilanediyl(2-methylbenzoindenyl)(2-methyl-4-phenylindenyl)Zr⁺ OCH₂ CH₂ B⁻(C₆F₅)₃;
dimethylsilanediyl(2-methylindenyl)(4-phenylindenyl)Zr⁺ OCH₂ CH₂ CH₂ B⁻(C₆F₅)₃;
dimethylsilanediylbis(2-methyl-4-phenylindenyl)Zr⁺ OCH₂ CH₂ CH₂ B⁻(C₆F₅)₃;
dimethylsilanediylbis(2-methyl-4,6-diisopropylindenyl)Zr⁺ OCH₂ CH₂ CH₂ B⁻(C₆F₅)₃;
dimethylsilanediylbis(2-methylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻(CF₃)₃;
dimethylsilanediylbisindenylZr⁺ CH₂ CHCHCH₂ B⁻(CF₃)₃;
dimethylsilanediylbis(2-methyl-4-phenylindenyl)Zr⁺ CH₂ C(CH₃)C(CH₃)CH₂ B⁻(CF₃)₃;

dimethylsilanediylbis(2-methyl-4,6-diisopropylindenyl)Zr⁺ CH₂C(CH₃)C(CH₃)CH₂ B⁻(CF₃)₃;

dimethylsilanediylbis(2-methyl-4-naphthylindenyl)Zr⁺ CH₂C(CH₃)C(CH₃)CH₂ B⁻(CF₃)₃;

methylphenylmethylenefluorenyl(cyclopentadienyl)Zr⁺ CH₂CHCHCH₂ B⁻(C₆F₅)₃;

diphenylmethylenefluorenyl(cyclopentadienyl)Zr⁺ CH₂CHCHCH₂ B⁻(C₆F₅)₃;

isopropylidene(3-methylcyclopentadienyl)fluorenylZr⁺ CH₂CHCHCH₂ B⁻(C₆F₅)₃;

dimethylsilanediyl(3-tert-butylcyclopentadienyl)fluorenylZr⁺ CH₂CHCHCH₂ B⁻(C₆F₅)₃;

diphenylsilanediyl(3-(trimethylsilyl)cyclopentadienyl)fluorenylZr⁺ CH₂CHCHCH₂ B⁻(C₆F₅)₃;

phenylmethylsilanediylbis(2-methylindenyl)Zr⁺ CH₂CHCHCH₂ B⁻(C₆F₅)₃;

phenylmethylsilanediylbisindenylZr⁺ CH₂CHCHCH₂ B⁻(C₆F₅)₃;

phenylmethylsilanediylbis(2-methyl-4,5-benzoindenyl)Zr⁺ CH₂CHCHCH₂ B⁻(C₆F₅)₃;

phenylmethylsilanediyl(2-methyl-4,5-benzoindenyl)(2-methylindenyl)Zr⁺ CH₂CHCHCH₂ B⁻(C₆F₅)₃;

phenylmethylsilanediyl(2-methyl-4,5-benzoindenyl)(2-methyl-4-phenylindenyl)Zr⁺ CH₂CHCHCH₂ B⁻(C₆F₅)₃;

phenylmethylsilanediyl(2-methylindenyl)(4-phenylindenyl)Zr⁺ CH₂CHCHCH₂ B⁻(C₆F₅)₃;

phenylmethyldilanediylbis(2-methyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

phenylmethyldilanediylbis(2-ethyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

phenylmethyldilanediylbis(2-methyl-4,6-diisopropylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

phenylmethyldilanediylbis(2-methyl-4-naphthylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylenebis(2-methylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylenebisindenylZr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylenebis(2-methyl-4,5-benzoindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylene(2-methyl-4,5-benzoindenyl)(2-methylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylene(2-methyl-4,5-benzoindenyl)(2-methyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylene(2-methylindenyl)(4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylenebis(2-methyl-4,5-benzoindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylenebis(2-methyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylenebis(2-methyl-4,6-diisopropylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylenebis(2-methyl-4-naphthylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylenebis(2-ethyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylenebis(2-ethyl-4,6-diisopropylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

ethylenebis(2-ethyl-4-naphthylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

dimethylsilanediylbis(2-ethyl-4-phenylindenyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;
dimethylsilanediylbis(2,3,5-trimethylcyclopentadienyl)Zr⁺ CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃;

1. 6-{bis[methylsilylbis(2-methyl-4-phenylindenyl)Zr⁺]CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃}hexane;

1,6-{bis[methylsilylbis(2-ethyl-4-phenylindenyl)Zr⁺]CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃}hexane;

1,6-{bis[methylsilylbis(2-methyl-4-naphthylindenyl)Zr⁺]CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃}hexane;

1,6-{bis[methylsilylbis(2-methyl-4,5-benzoindenyl)Zr⁺]CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃}hexane;

1,6-{bis[methylsilyl(2-methyl-4-phenylindenyl)(2-methylindenyl)Zr⁺]CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃}hexane;

1,2-{bis[methylsilylbis(2-methyl-4-phenylindenyl)Zr⁺]CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃}ethane;

1,2-{bis[methylsilylbis(2-ethyl-4-phenylindenyl)Zr⁺]CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃}ethane;

1,2-{bis[methylsilylbis(2-methyl-4-naphthylindenyl)Zr⁺]CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃}ethane;

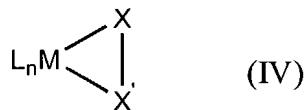
1,2-{bis[methylsilylbis(2-methyl-4,5-benzoindenyl)Zr⁺]CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃}ethane; and

1,2-{bis[methylsilyl(2-methyl-4-phenylindenyl)(2-methylindenyl)Zr⁺]CH₂ CHCHCH₂ B⁻ (C₆ F₅)₃}ethane.

20. (original) The compound as claimed in claim 1, wherein M is zirconium.

21. (original) The compound as claimed in claim 1, wherein M is a metal atom group IVb of the Periodic Table of Elements.

22. A transition metal compound of the formula IV



wherein

L are identical or different and are each a substituted π ligand,

n is equal to 1, 2, 3, or 4,

M is a metal atom of group IIIb, IVb, Vb or VIb of the Periodic Table of the Elements,

X is a heteroatom or a hydrocarbon group having 1-40 carbon atoms,

X' is a hydrocarbon group having 1-40 carbon atoms.

23. The transition metal compound as claimed in claim 22, wherein the radicals L are identical or different and are each a substituted cyclopentadienyl group.

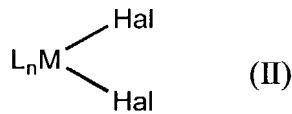
24. The transition metal compound as claimed in claim 22, wherein the radicals L are linked to one another via a bridge.

25. The transition metal compound as claimed in claim 22, wherein n is 2 when M is a metal atom of group IVb of the Periodic Table of the Elements.

26. The transition metal compound as claimed in claim 22, wherein M is a metal atom of group IVb of the Periodic Table of the Elements, n is equal to 2,
L are identical or different and are each a substituted cyclopentadienyl group,
where two radicals L are optionally linked to one another via a bridge Z and
Z is CR²R³ or SiR²R³ or a unit Si-(CR²R³)_x-Si which links two fragments
L_uMXX'A-R_m¹ with one another, where x is an integer from 0 to 10,
X and X' together form a three-membered to five-membered hydrocarbon chain which
can be saturated or unsaturated and are unsubstituted or substituted by one or
more C₁-C₂₀-hydrocarbon radicals,
R² and R³ are identical or different and are each a hydrogen atom, a halogen atom, a
C₁-C₂₀-alkyl group, a C₁-C₁₀-fluoralkyl group, a C₁-C₁₀-alkoxy group, a C₆-C₁₄-aryl group, a C₆-C₁₀-fluoroaryl group, a C₆-C₁₀-aryloxy group, a C₂-C₁₀-alkenyl group, a C₇-C₄₀-arylalkyl group, a C₇-C₄₀-alkylaryl group, a C₈-C₄₀-arylalkenyl group, or R² and R³ together with the atoms connected them form one or more rings, and R² and R³ are optionally bonded to L.

27. The transition metal compound as claimed in claim 22, wherein
M is zirconium,
n is equal to 2,
L are identical or different and are each a substituted cyclopentadienyl group,
where two radicals L are linked to one another via a bridge Z, where Z is
 CR^2R^3 or SiR^2R^3 and
 R^2 and R^3 are identical or different and are each a hydrogen atom, a halogen atom, a
 $\text{C}_1\text{-C}_{20}$ -alkyl group, a $\text{C}_1\text{-C}_{10}$ -fluoralkyl group, a $\text{C}_1\text{-C}_{10}$ -alkoxy group, a $\text{C}_6\text{-C}_{14}$ -
aryl group, a $\text{C}_6\text{-C}_{10}$ -fluoroaryl group, a $\text{C}_6\text{-C}_{10}$ -aryloxy group, a $\text{C}_2\text{-C}_{10}$ -alkenyl
group, a $\text{C}_7\text{-C}_{40}$ -arylalkyl group, a $\text{C}_7\text{-C}_{40}$ -alkylaryl group, a $\text{C}_8\text{-C}_{40}$ -arylalkenyl
group, or R^2 and R^3 together with the atoms connected them form one or more
rings, and R^2 and R^3 are optionally bonded to L,
X and X' together form an unsaturated four-membered hydrocarbon chain whose
hydrogen atoms are optionally replaced by $\text{C}_1\text{-C}_{20}$ -alkyl groups.

28. A process for preparing the compound as claimed in claim 22,
which comprises reacting a compound of the formula II

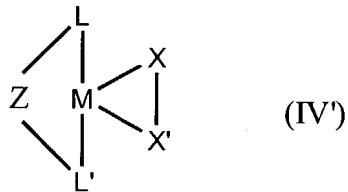


with a compound of the formula III



and reacting the reaction product with a compound of the formula AR_m^1 , where L, n,
M, X and X' in the formulae II and III are defined for the formula IV and Hal is
a halogen atom.

29. A transition metal compound of the formula IV'



where

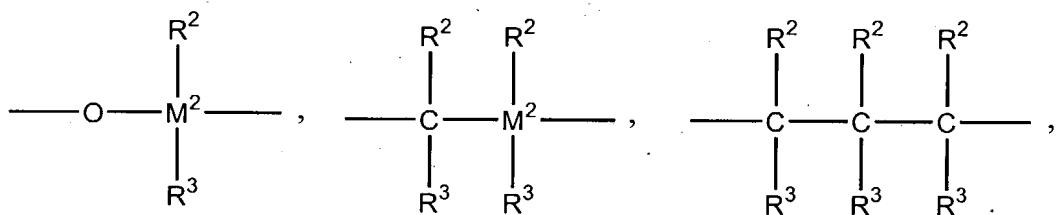
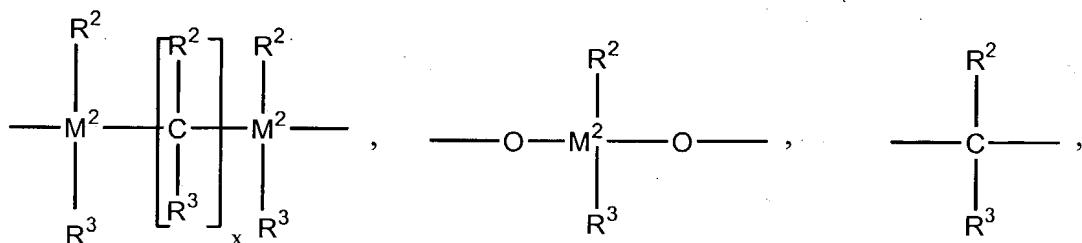
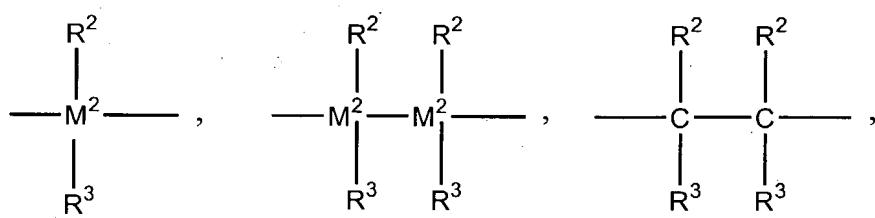
L and L' are identical or different and are each a π ligand or an electron donor,

M is a metal atom of group IIIb, IVb, Vb or VIb of the Periodic Table of
the Elements,

X is a heteroatom or a hydrocarbon group having 1-40 carbon atoms,

X' is a hydrocarbon group having 1-40 carbon atoms,

Z is



=BR₂, -AlR², -Ge-, -O-, -S-, =SO, =SO₂, -NR₂, =CO, =PR² or =P(O)R², where R² and R³ are identical or different and are each a hydrogen atom, a halogen atom, a C₁-C₂₀-alkyl group, a C₁-C₁-fluoroalkyl group, a C₁-C₁₀-alkoxy group, a C₆-C₁₄-aryl group, a C₆-C₁₀-fluoroaryl group, a C₆-C₁₀-aryloxy group, a C₂-C₁₀-alkenyl group, a C₇-C₄₀-arylalkyl group, a C₇-C₄₀-alkylaryl group, a C₈-C₄₀-arylklenyl group and x is a number from zero to 18, or R² and R³ together with the atoms-connecting them form one or more rings and R² or/and R³ can be bonded to L and M² is silicon, germanium or tin.

30. The transition metal compound as claimed in claim 29, wherein the radicals L are identical or different and are each an unsubstituted or substituted cyclopentadienyl group.

31. The transition metal compound as claimed in claim 29, wherein the radicals L are linked to one another via a bridge.

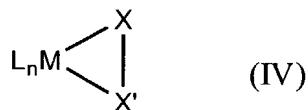
32. The transition metal compound as claimed in claim 29, wherein n is 2 when M is a metal atom of group IVb of the Periodic Table of the Elements.

33. The transition metal compound as claimed in claim 29, wherein M is a metal atom of group IVb of the Periodic Table of the Elements, n is equal to 2, L are identical or different and are each a substituted or unsubstituted cyclopentadienyl group, where two radicals L are optionally linked to one another via a bridge Z and Z is CR²R³ or SiR²R³ or a unit Si-(CR²R³)_x-Si which links two fragments L_yM'XX'A-R¹_m with one another, where x is an integer from 0 to 10, X and X' together form a three-membered to five-membered hydrocarbon chain which can be saturated or unsaturated and are unsubstituted or substituted by one or more C₁-C₂₀-hydrocarbon radicals,

R² and R³ are identical or different and are each a hydrogen atom, a halogen atom, a C₁-C₂₀-alkyl group, a C₁-C₁₀-fluoralkyl group, a C₁-C₁₀-alkoxy group, a C₆-C₁₄-aryl group, a C₆-C₁₀-fluoroaryl group, a C₆-C₁₀-aryloxy group, a C₂-C₁₀-alkenyl group, a C₇-C₄₀-arylalkyl group, a C₇-C₄₀-alkylaryl group, a C₈-C₄₀-arylalkenyl group, or R² and R³ together with the atoms connected them form one or more rings, and R² and R³ are optionally bonded to L.

34. The transition metal compound as claimed in claim 29, wherein
M is zirconium,
n is 2,
L are identical or different and are each a substituted cyclopentadienyl group,
where two radicals L are linked to one another via a bridge Z, where Z is
CR²R³ or SiR²R³,
R² and R³ are identical or different and are each a hydrogen atom, a halogen atom, a
C₁-C₂₀-alkyl group, a C₁-C₁₀-fluoralkyl group, a C₁-C₁₀-alkoxy group, a C₆-C₁₄-aryl group, a C₆-C₁₀-fluoroaryl group, a C₆-C₁₀-aryloxy group, a C₂-C₁₀-alkenyl group, a C₇-C₄₀-arylalkyl group, a C₇-C₄₀-alkylaryl group, a C₈-C₄₀-arylalkenyl group, or R² and R³ together with the atoms connected them form one or more rings, and R² and R³ are optionally bonded to L.

X and X' together form an unsaturated four-membered hydrocarbon chain whose
hydrogen atoms are optionally replaced by C₁-C₂₀-alkyl groups.

35. A transition metal compound of the formula IVwhereinL are different if n is 2, 3 or 4, and are each a π ligand or electron donor,n is equal to 1, 2, 3, or 4,M is a metal atom of group IIIb, IVb, Vb or VIb of the Periodic Table of the Elements,X is a heteroatom or a hydrocarbon group having 1-40 carbon atoms,X' is a hydrocarbon group having 1-40 carbon atoms.

36. The transition metal compound as claimed in claim 35, wherein the radicals L are different and are each an unsubstituted or substituted cyclopentadienyl group.

37. The transition metal compound as claimed in claim 35, wherein the radicals L are linked to one another via a bridge.

38. The transition metal compound as claimed in claim 35, wherein n is 2 when M is a metal atom of group IVb of the Periodic Table of the Elements.

39. The transition metal compound as claimed in claim 35, wherein

M is a metal atom of group IVb of the Periodic Table of the Elements, n is equal to
2,

L are different and are each a substituted or unsubstituted cyclopentadienyl group,
where two radicals L are optionally linked to one another via a bridge Z and

Z is CR²R³ or SiR²R³ or a unit Si-(CR²R³)_x-Si which links two fragments
L_qM'XX'A-R¹_m with one another, where x is an integer from 0 to 10,
X and X' together form a three-membered to five-membered hydrocarbon chain which
can be saturated or unsaturated and are unsubstituted or substituted by one or
more C₁-C₂₀-hydrocarbon radicals,

R² and R³ are identical or different and are each a hydrogen atom, a halogen atom, a
C₁-C₂₀-alkyl group, a C₁-C₁₀-fluoralkyl group, a C₁-C₁₀-alkoxy group, a C₆-C₁₄-
aryl group, a C₆-C₁₀-fluoroaryl group, a C₆-C₁₀-aryloxy group, a C₂-C₁₀-alkenyl
group, a C₇-C₄₀-arylalkyl group, a C₇-C₄₀-alkylaryl group, a C₈-C₄₀-arylalkenyl
group, or R² and R³ together with the atoms connected them form one or more
rings, and R² and R³ are optionally bonded to L.

40. The transition metal compound as claimed in claim 35, wherein

M is zirconium,

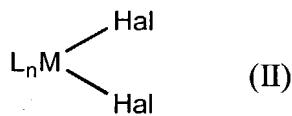
n is 2,

L are different and are each a substituted cyclopentadienyl group, where two radicals L are linked to one another via a bridge Z, where Z is CR²R³ or SiR²R³ and

R² and R³ are identical or different and are each a hydrogen atom, a halogen atom, a C₁-C₂₀-alkyl group, a C₁-C₁₀-fluoralkyl group, a C₁-C₁₀-alkoxy group, a C₆-C₁₄-aryl group, a C₆-C₁₀-fluoroaryl group, a C₆-C₁₀-aryloxy group, a C₂-C₁₀-alkenyl group, a C₇-C₄₀-arylalkyl group, a C₇-C₄₀-alkylaryl group, a C₈-C₄₀-arylalkenyl group, or R² and R³ together with the atoms connected them form one or more rings, and R² and R³ are optionally bonded to L.

X and X' together form an unsaturated four-membered hydrocarbon chain whose hydrogen atoms are optionally replaced by C₁-C₂₀-alkyl groups.

41. A process for preparing the compound as claimed in claim 35, which comprises reacting a compound of the formula II

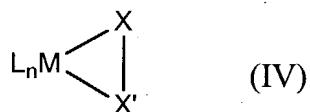


with a compound of the formula III



and reacting the reaction product with a compound of the formula AR¹_m, where L, n,
M, X and X' in the formulae II and III are defined for the formula IV,
Hal is a halogen atom.

42. A transition metal compound of the formula IV



wherein

L are identical or different and are each a π ligand or electron donor,

n is equal to 1, 2, 3, or 4,

M is a metal atom of group IIIb, IVb, Vb or VIb of the Periodic Table of the Elements,

X is a heteroatom, a C₆-C₁₄-aryl group, a C₇-C₄₀-arylalkyl group, a C₇-C₄₀-alkylaryl group or a C₈-C₄₀-arylalkenyl group,

X' or a hydrocarbon group having 1-40 carbon atoms.

43. The transition metal compound as claimed in claim 42, wherein the radicals L are different and are each an unsubstituted or substituted cyclopentadienyl group.

44. The transition metal compound as claimed in claim 42, wherein the radicals L are linked to one another via a bridge.

45. The transition metal compound as claimed in claim 42, wherein n is 2 when M is a metal atom of group IVb of the Periodic Table of the Elements.

46. The transition metal compound as claimed in claim 42, wherein M is a metal atom of group IVb of the Periodic Table of the Elements, n is equal to 2,
L are different and are each a substituted or unsubstituted cyclopentadienyl group, where two radicals L are optionally linked to one another via a bridge Z and
Z is CR²R³ or SiR²R³ or a unit Si-(CR²R³)_x-Si which links two fragments
L_uM'^tX'X-A-R¹_m with one another, where x is an integer from 0 to 10,
X and X' together form a three-membered or five-membered hydrocarbon chain which
can be saturated or unsaturated and are unsubstituted or substituted by one or
more C₁-C₂₀-hydrocarbon radicals,
R² and R³ are identical or different and are each a hydrogen atom, a halogen atom, a
C₁-C₂₀-alkyl group, a C₁-C₁₀-fluoralkyl group, a C₁-C₁₀-alkoxy group, a C₆-C₁₄-

aryl group, a C₆-C₁₀-fluoroaryl group, a C₆-C₁₀-aryloxy group, a C₂-C₁₀-alkenyl group, a C₇-C₄₀-arylalkyl group, a C₇-C₄₀-alkylaryl group, a C₈-C₄₀-arylalkenyl group, or R² and R³ together with the atoms connected them form one or more rings, and R² and R³ are optionally bonded to L.

47. The transition metal compound as claimed in claim 42, wherein
M is zirconium,
n is 2,
L are different and are each a substituted cyclopentadienyl group, where two
radicals L are linked to one another via a bridge Z, where Z is CR²R³ or SiR²R³
and
R² and R³ are identical or different and are each a hydrogen atom, a halogen atom, a
C₁-C₂₀-alkyl group, a C₁-C₁₀-fluoralkyl group, a C₁-C₁₀-alkoxy group, a C₆-C₁₄-
aryl group, a C₆-C₁₀-fluoroaryl group, a C₆-C₁₀-aryloxy group, a C₂-C₁₀-alkenyl
group, a C₇-C₄₀-arylalkyl group, a C₇-C₄₀-alkylaryl group, a C₈-C₄₀-arylalkenyl
group, or R² and R³ together with the atoms connected them form one or more
rings, and R² and R³ are optionally bonded to L.

48. A compound selected from the group consisting of

Bis(methylcyclopentadienyl)ZrCH₂CHCHCH₂;
Bis(n-butyl-cyclopentadienyl)ZrCH₂CHCHCH₂;
BisindenylZrCH₂CHCHCH₂;
(tert.butylamido)dimethyl(tetramethyl- η^5 -cyclopentadienyl)silan-Zr⁺CH₂CHCHCH₂;
Bis(2-methylbenzoindenyl)ZrCH₂CHCHCH₂;
Dimethylsilandiylbis(2-methyl-indenyl)ZrCH₂CHCHCH₂;
DimethylsilandiylbisindenylZr⁺CH₂CHCHCH₂;
Dimethylsilandiylbis(2-methylbenzoindenyl)ZrCH₂CHCHCH₂;
Dimethylsilandiyl(2-methylbenzoindenyl)(2-methyl-indenyl)ZrCH₂CHCHCH₂;
Dimethylsilandiyl(2-methylbenzoindenyl)(2-methyl-4-phenylindenyl)ZrCH₂CHCHCH₂;
Dimethylsilandiyl(2-methylindenyl)(4-phenylindenyl)ZrCH₂CHCHCH₂;
Dimethylsilandiylbis(2-methyl-4-phenyl-indenyl)ZrCH₂CHCHCH₂;
Dimethylsilandiylbis(2-methyl-4,6-diisopropyl-indenyl)Zr⁺CH₂CHCHCH₂;
Dimethylsilaniylbis(2-methyl-4-naphtyl-indenyl)ZrCH₂CHCHCH₂;
Isopropyliden(cyclopentadienyl)(fluorenyl)ZrCH₂CHCHCH₂;
Isopropyliden(cyclopentadienyl)(indenyl)ZrCH₂CHCHCH₂;
[4-(η^5 -Cyclopentadienyl)-4,7,7-trimethyl-(η^5 -4,5,6,7-tetrahydro-indenyl)ZrCH₂CHCHCH₂;
Dimethylsilandiylbis(2-methyl-indenyl)ZrOCH₂CH₂CH₂;
DimethylsilandiylbisindenylZrOCH₂CH₂CH₂;
Dimethylsilandiylbis(2-methylbenzoindenyl)ZrOCH₂CH₂CH₂;
Dimethylsilandiyl(2-methylbenzoindenyl)(2-methyl-indenyl)ZrOCH₂CH₂CH₂;
Dimethylsilandiyl(2-methylbenzoindenyl)(2-methyl-4-phenylindenyl)ZrOCH₂CH₂CH₂;
Dimethylsilandiyl(2-methylindenyl)(4-phenylindenyl)ZrOCH₂CH₂CH₂;
Dimethylsilandiylbis(2-methyl-4-phenyl-indenyl)ZrOCH₂CH₂CH₂;
Dimethylsilandiylbis(2-methyl-4,6-diisopropyl-indenyl)ZrOCH₂CH₂CH₂;
Dimethylsilandiylbis(2-methyl-indenyl)ZrCH₂C(CH₃)C(CH₃)CH₂;
DimethylsilandiylbisindenylZrCH₂C(CH₃)C(CH₃)CH₂;
Dimethylsilandiylbis(2-methylbenzoindenyl)Zr⁺CH₂C(CH₃)C(CH₃)CH₂;
Dimethylsilandiyl(2-methylbenzoindenyl)(2-methyl-indenyl)ZrCH₂C(CH₃)C(CH₃)CH₂;
Dimethylsilandiyl(2-methylbenzoindenyl)(2-methyl-4-phenylindenyl)ZrCH₂C(CH₃)C(CH₃)CH₂;
ZrCH₂C(CH₃)C(CH₃)CH₂;

Dimethylsilandiy1(2-methlindenyl)(4-phenylindenyl)

ZrCH₂C(CH₃)C(CH₃)CH₂;

Dimethylsilandiy1bis(2-methyl-4-phenyl-indenyl)

ZrCH₂C(CH₃)C(CH₃)CH₂;

Dimethylsilandiy1bis(2-methyl-4,6-diisopropyl-indenyl)

ZrCH₂C(CH₃)C(CH₃)CH₂;

Dimethylsilaniylbis(2-methyl-4-naphtyl-indenyl)

ZrCH₂C(CH₃)C(CH₃)CH₂;

Methylphenylmethylen-(fluorenyl)(cyclopentadienyl)ZrCH₂CHCHCH₂;

Diphenylmethylen-(fluorenyl)(cyclopentadienyl)ZrCH₂CHCHCH₂;

Isopropyliden-(3-methylcyclopentadienyl)(fluorenyl)

ZrCH₂CHCHCH₂B-(C₆F₅)₃;

Dimethylsilandiy1-(3-tert.-Butylcyclopentadienyl)(fluorenyl)

ZrCH₂CHCHCH₂;

Diphenylsilandiy1-(3-(trimethylsilyl)cyclopentadienyl)(fluorenyl)

ZrCH₂CHCHCH₂;

Phenylmethylsilandiy1bis(e-methyl-indenyl)ZrCH₂CHCHCH₂;

Phenylmethylsilandiy1bisindenylZrCH₂CHCHCH₂;

Phenylmethylsilandiy1bis(2-methyl-4,5-benzoindenyl)ZrCH₂CHCHCH₂;

Phenylmethylsilandiy1bis(2-methyl-4,5-benzoindenyl)(2-methyl-indenyl)ZrCH₂CHCHCH₂

Phenylmethylsilandiy1(2-methyl-4,5-benzoindenyl)(2-methyl-4-phenylindenyl)ZrCH₂CHCHCH₂;

Phenylmethysilaniyl(2-methylindenyl)(4-phenylindenyl)

ZrCH₂CHCHCH₂;

Phenylmethylsilandiy1bis(2-methyl-4-phenyl-indenyl)ZrCH₂CHCHCH₂;

Phenylmethylsilandiy1bis(2-ethyl-4-phenyl-indenyl)ZrCH₂CHCHCH₂;

Phenylmethylsilandiy1bis(2-methyl-4,6-diisopropyl-indenyl)

ZrCH₂CHCHCH₂;

Phenylmethylsilandiy1bis(2-methyl-4-naphtyl-indenyl)ZrCH₂CHCHCH₂;

Ethylenbis(2-methyl-indenyl)ZrCH₂CHCHCH₂;

EthylenbisindenylZrCH₂CHCHCH₂;

Ethylenbis(2-methyl-4,5-benzoindenyl)ZrCH₂CHCHCH₂;

Ethylen(2-methyl-4,5-benzoindenyl)(2-methyl-indenyl)ZrCH₂CHCHCH₂;

Ethylen(2-methyl-4,5-benzoindenyl)(2-methyl-4-phenylindenyl)

ZrCH₂CHCHCH₂;

Ethylen(2-methylindenyl)(4-phenylindenyl)ZrCH₂CHCHCH₂;

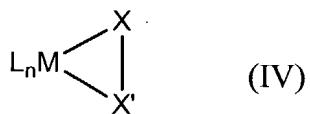
Ethylenbis(2-methyl-4,5-benzoindenyl)ZrCH₂CHCHCH₂;

Ethylenbis(2-methyl-4-phenyl-indenyl)ZrCH₂CHCHCH₂;

Ethylenbis(2-methyl-4,6-diisopropyl-indenyl)ZrCH₂CHCHCH₂;

Ethylenbis(2-methyl-4-naphtyl-indenyl) ZrCH₂CHCHCH₂;
Ethylenbis(2-ethyl-4-phenyl-indenyl) ZrCH₂CHCHCH₂;
Ethylenbis(2-ethyl-4,6-diisopropyl-indenyl) ZrCH₂CHCHCH₂;
Ethylenbis(2-ethyl-4-naphtyl-indenyl) ZrCH₂CHCHCH₂;
Dimethylsilandiylibis(2-ethyl-4-phenyl-indenyl) ZrCH₂CHCHCH₂;
Dimethylsilandiylibis(2,3,5-trimethylcyclopentadienyl)
ZrCH₂CHCHCH₂;
1,6-{Bis[methylsilyl-bis(2-methyl-4-phenyl-indenyl) Zr+CH₂]CHCHCH₂
B-(C₆F₅)₃} hexan;
1,6-{Bis[methylsilyl-bis(2-ethyl-4-phenyl-indenyl)
Zr+CH₂]CHCHCH₂B-(C₆F₅)₃} hexan;
1,6-{Bis[methylsilyl-bis(2-methyl-4-naphtyl-indenyl) Zr+CH₂]CHCHCH₂
B-(C₆F₅)₃} hexan;
1,6-{Bis[methylsilyl-bis(2-methyl-4,5-benzoindenyl) Zr+CH₂]CHCHCH₂
B-(C₆F₅)₃} hexan;
1,6-{Bis[methylsilyl-(2-methyl-4-phenyl-indenyl) (2-methyl-indenyl) Zr+CH₂]CHCHCH₂B-(C₆F₅)₃} hexan;
1,2-{Bis[methylsilyl-bis(2-methyl-4-phenyl-indenyl) Zr+CH₂]CHCHCH₂
B-(C₆F₅)₃} ethan;
1,2-{Bis[methylsilyl-bis(2-ethyl-4-phenyl-indenyl) Zr+CH₂]CHCHCH₂
B-(C₆F₅)₃} ethan;
1,2-{Bis[methylsilyl-bis(2-methyl-4-naphtyl-indenyl) Zr+CH₂]CHCHCH₂
B-(C₆F₅)₃} ethan;
1,2-{Bis[methylsilyl-bis(2-methyl-4,5-benzoindenyl) Zr+CH₂]CHCHCH₂
B-(C₆F₅)₃} ethan; and
1,2-{Bis[methylsilyl-(2-methyl-4-phenyl-indenyl) (2-methyl-indenyl) Zr+CH₂]CHCHCH₂B-(C₆F₅)₃} ethan.

49. A transition metal compound of the formula IV



wherein

L are identical or different and are each a π ligand or electron donor,
n is equal to 1, 2, 3, or 4,
M is a metal atom of group IIIb, IVb, Vb or VIb of the Periodic Table of the Elements,

X is a heteroatom or a hydrocarbon group having 1-40 carbon atoms,
X' is a hydrocarbon group having 1-40 carbon atoms,

with the proviso that at least one L is a substituted or unsubstituted indenyl.

50. The transition metal compound as claimed in claim 49, wherein the radicals L are linked to one another via a bridge.

51. The transition metal compound as claimed in claim 49, wherein n is 2 when M is a metal atom of group IVb of the Periodic Table of the Elements.

52. The transition metal compound as claimed in claim 49, wherein

M is a metal atom of group IVb of the Periodic Table of the Elements, n is equal to 2,
where two radicals L are optionally linked to one another via a bridge Z and
Z is CR²R³ or SiR²R³ or a unit Si-(CR²R³)_x-Si which links two fragments
L₁M'XX'A-R¹_m with one another, where x is an integer from 0 to 10,
R² and R³ are identical or different and are each a hydrogen atom, a halogen atom, a
C₁-C₂₀-alkyl group, a C₁-C₁₀-fluoralkyl group, a C₁-C₁₀-alkoxy group, a C₆-C₁₄-
aryl group, a C₆-C₁₀-fluoroaryl group, a C₆-C₁₀-aryloxy group, a C₂-C₁₀-alkenyl
group, a C₇-C₄₀-arylalkyl group, a C₇-C₄₀-alkylaryl group, a C₈-C₄₀-arylalkenyl
group, or R² and R³ together with the atoms connected them form one or more
rings, and R² and R³ are optionally bonded to L.

53. The transition metal compound as claimed in claim 49, wherein

M is zirconium,

n is 2,

where two radicals L are linked to one another via a bridge Z, wherein

Z is CR²R³ or SiR²R³ and

R² and R³ are identical or different and are each a hydrogen atom, a halogen atom, a

C₁-C₂₀-alkyl group, a C₁-C₁₀-fluoralkyl group, a C₁-C₁₀-alkoxy group, a C₆-C₁₄-
aryl group, a C₆-C₁₀-fluoroaryl group, a C₆-C₁₀-aryloxy group, a C₂-C₁₀-alkenyl
group, a C₇-C₄₀-arylalkyl group, a C₇-C₄₀-alkylaryl group, a C₈-C₄₀-arylalkenyl

group, or R² and R³ together with the atoms connected them form one or more rings, and R² and R³ are optionally bonded to L.